AMENDMENTS TO THE SPECIFICATION:

Please amend the following paragraphs as indicated:

[0001] [This] The present invention relates to a method and apparatus for providing simultaneous multi-path inputs in a system with multiple simultaneous input and output modes such as voice and display/keyboard, or system where many users may interact with the same sessions, such as a remote learning session where multiple students attend a given class. [This]The present invention resolves the issue of two or more input values from multiple different devices or users attempting to occupy the same location.

[0002] Various services now provide voice and non-voice access to Internet data. A caller may access a "Voice Portal" or "Voice Site" by simply dialing a number advertised by the company providing the Voice Access service. The caller will hear a greeting that requests the caller to "speak" or "enter" specific commands. As an [example]example, a caller may ask the system to provide him/her with the latest [whether]weather information by simply speaking a command, or pressing a DTMF button on the phone. The information provided to the user may be pre-recorded and accessed from a database, or it may be accessed from a page similar to those available on the Internet. The mark-up language used to code the page may be VoiceXML or any other type of XML-based coding language. Some legacy systems may use proprietary or less commonly used methods for connecting the system to back-end data servers.

[0003] [However]However, in all existing [systems]systems, users interact with data only through one interface, [it is]that is, either a voice interface (e.g., a [[a]] telephone) or a data interface (e.g., an [an] Internet browser). This single mode interaction causes limitations on delivery of services to users. As an [example]example, a user who is driving a car may ask for address information between point A and point B by issuing voice commands, and hear back the directions read to him via a speaker in the car. However, the [the] same navigation information would not be available in graphical format. Another example is a user who is using a [data]data-enabled mobile phone to review his investment portfolio. The user may wish to see the data, but input the queries by simply speaking them into the phone. Current systems do not allow for such capability.

[0004] Another limitation of existing systems is that they do not allow more than one user to interact with an application in one session. The [current]present invention makes this possible. One example of where this may be required is a cooperative form filling application where two users need to be logged onto the same session, and each answers specific questions as they are presented. The [current inventions] present invention makes it possible for the two attendants to call into the system, and interact with the same application through a single session, thereby filling one form by two users.

[0005] The problem that arises in multi-modal or multi-user interaction with a single session (as in the above examples) is that multiple input values may be received for the same query through different channels. A simple solution would be to accept the first chronologically arriving input value, and discard the subsequent ones. This solution, however, fails when there are many rounds of query-input in the same application. Consider the case of a query **A** followed by two inputs *a*-1 and *a*-2. Input *a*-1 is accepted, but before input *a*-2 arrives in the system, another query **B** is made. Now input *a*-2 arrives in the system followed by a valid input *b*-1. The system would accept false input *a*-2, and discard valid input *b*-1. Fig. 1 illustrates when "Accept First Input" fails in the case of multiple queries and inputs. Throughout the Figs. 1, 2 and 3, the sunburst symbol 12 represents an accepted input, and the crossed-out symbol 14 represents an incorrectly accepted input or an incorrectly discarded input, for illustrative purposes.

[0006] The solution to this problem is to identify every input with the name of the query that it is attempting to address. In this [case]case, the system would know that the second a-2 input is not intended for query B, would discard it, and would accept the valid input b-1.

[0007] However, this [this] solution also falls short when the same dialog is repetitively used. For example if the system makes a query A for the first time (designated as A1). Two responses a1-1 and a1-2 are sent back. Response a-1 is

accepted as valid, but before response a1-2 arrives, the system repeats the same dialog, repeating query A (designated as A2). User(s) reply with a response a2-1. However, false [false] response a1-2 arrives first, is accepted as valid, and valid input a2-1 is discarded as invalid. Fig. 2 "Accept Tagged Input" fails when the same dialog is repeated.

[0008] The present invention resolves the above-described problem by adding a query turn indicator (invocation counter) to each input name, and then accepting only those response values whose tag and turn indicator match the expected input. For example, when query A is made for the first time, the system registers an open slot for input values matching query A-1. User inputs are all tagged in the same fashion[[. So]]so that all inputs in response to query A-1 would be tagged as A-1-n (n being the path identifier). Fig. 3 illustrates how "Accept Tagged Input with Turn Indicator" accepts only the proper input. As seen in Fig. 3, this method allows the system to properly identify the response values, and discard the false ones.

[0010] The method of simultaneous, multi-path [multi-path] inputs of the present invention enables inputs to be made via any voice interface or data interface devices (e.g. phone, Keyboard, PDA, etc.) used during the same session. The inputs are fed to the session object, and given unique identifiers, or unique "tickets" for each input. An invocation counter in turn tracks when the inputs are made. The inputs and their associated identifiers are stored in the memory of the session object.

[0013] Fig. 1 illustrates when a conventional "Accept First Input" fails in the case of two consecutive queries and two nearly simultaneous responses to the first query, and how the second input (made in response to the first query) may be accepted by mistake as a valid response to the second query;

[0014] Fig. 2 illustrates when a conventional "Accept Tagged Input" fails when the same dialog is repeated, and that, if the input data is tagged to the dialog alone, a problem occurs if the same dialog is repeated twice, and the second input (made in response to the first query) is accepted by mistake as a valid response to the second query;

[0015] Fig. 3 illustrates when "Accept Tagged Input with Turn Indicator" accepts only the proper input in accordance with an embodiment of the present invention; and

[0016] Fig. 4 illustrates how Inputs A and B are made simultaneously, and how Input B attempts to occupy the same location as Input A but is discarded in accordance with an embodiment of the present invention.

[0017] With [Reference to Fig. 4]reference to Fig. 4, a software method is provided in accordance with the present invention to allow one or more users to

interact with data and applications in using multiple modes of interaction (voice, data, etc.) simultaneously. The solution comprises four main components, that is,

- a Session Management Gateway (7) capable of interacting with an application (9) via the Internet (6) from the one side (i.e., using standard Internet protocols for connection to Internet[based]-based applications) and multiple client interfaces such as a Telephone Interface (3) or a Data Device interface (5) from the other side, and also capable of maintaining the transaction session with the Application (9) separate from interaction sessions with client devices, and capable of maintaining the interaction session with the application (9) in a database (8) even if no client device is connected at that moment to the session pertaining to the said transaction.
- a Data Device Interface (5) capable of interacting with data devices (4) equipped with display, keyboard, sound interface, location sensor, [etc]and so on. Data device (4) may have any combination of one or more human or machine data sources which can relay user input ([[e.g.]]e.g., a keyboard) or produce data automatically ([[e.g.]]e.g., a location sensor)[[as]], as well as modules which can present data ([[e.g.]]e.g., a display that shows the data to a human, or a relay that uses the data to control an engine).
- a Telephony Interface (3) that allows callers to access their sessions using any type of voice interface devices (e.g. a mobile phone (1)),

via a network such as a public switched telephone network (PSTN) (2) and is capable of presenting the data to the user in audible fashion, and also capable of collecting input from the user in spoken fashion (spoken commands) as well as other forms such as DTMF input.

- A Database (8) which maintains transaction sessions controlled by Session Management Gateway (7).

[0018] With reference to Fig. 4, a software system for voice and non-voice access to data and application for simultaneous multi-path user access [[and]]is shown that uses a ticketing mechanism to track the order of the inputs in accordance with the present invention. Voice devices can include telephone-based devices as well as microphone access to an Internet system. Non-voice devices can include keyboard, Personal Digital Assistant (PDA). As shown in Fig. 4, Inputs A and B are made simultaneously. Input B tries to occupy the same location as Input A, but is discarded.

[0019] A simultaneous input session involves concurrent inputs from multiple devices. In Fig. 4, the application in the backend (9) issues Query 1 to the Session Management Gateway (7). [[Query]]Query 1 is formatted for each client, and is assigned a unique identifier and an invocation counter identifying how many times the same exact query in this dialog has been visited in this session. The resulting query is then sent to all client interfaces currently logged to the transaction session pertaining to this interaction. In response to Query 1, user makes an utterance in the mobile

phone (1) , which is taken as Input A. Each client interface will attach the proper identifier and invocation counter to the input phrases arriving from the client interface, and sends that to Session Management Gateway (7).

[0021] It is obvious to those trained in the art that the same string could contain the unique identifier and the invocation counter. [[ ]]

For example, the user is using the system to order food. The user has both voice and keyboard access. When asked what kind of cuisine is desired, the user types, "Chinese" (Input A). Because the user is anxious, she simultaneously says into the microphone "Chinese" (Input B) during a system delay. The system then prompts, "You want to order Chinese food?" The user changes her mind and says, "No." When the system returns to the menu, the voice input, "Chinese," arrives (delayed) but is denied because it was made during an earlier invocation.

[0023] A method and system for providing a simultaneous, multi-path, multi-modal, and multi-user interface to users is discussed, where multiple inputs during the same user session arriving from different devices are handled properly. Each input is assigned a unique identifier, clocked with a counter and associated with an address. Other inputs that attempt to arrive at the same location are discarded.